has perhaps not yet been realized. These structures are of particular significance in those cases in which the more obvious characters are not conclusive. A systematic arrangement of noctuid larvæ can only result from a more detailed morphological examination of all larval structures. Such progress should be of special importance to lepidopterists and agricultural entomologists.

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NOTES ON NORTH AMERICAN SPECIES OF MEGARHYSSA

(Hymenoptera, Ichneumonidæ)

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The genus *Megarhyssa* Ashmead has recently been placed by Roman (1933:38) in synonymy with *Pimpla* Fabricius on the basis of a supposed type designation by Fabricius. However, as pointed out by Richards (1937:117), Fabricius did not designate genotypes in the sense of the present code of nomenclature; he merely described one species in most of his genera more fully than any of the others. For this reason, it seems that *Megarhyssa* should not be considered a synonym of *Pimpla.*

Although several authors have given keys to our four species of *Megarhyssa,* identification of certain specimens has remained difficult because of the great color variation in some species. In the keys here given, therefore, an attempt has been made to use structural characteristics in separating the species.

KEY TO THE NORTH AMERICAN SPECIES OF MEGARHYSSA

FEMALES

1. Middle of posterior margin of heavily sclerotized portion of first sternite distinctly behind a vertical line through posterior end of first abdominal spiracle; ovipositor about one and one-half times as long as body; length of sclerotized part of

seventh tergite on middorsal line nearly equal to length of sixth tergite middorsally..*greenei* Viereck

–. Middle of posterior margin of heavily sclerotized portion of first sternite anterior to a vertical line through posterior end of first abdominal spiracle; ovipositor nearly twice to nearly three times as long as body; length of sclerotized part of seventh tergite on middorsal line less than one-half length of sixth tergite middorsally..2

2. Malar space nearly as long as basal width of mandibles; face black with broad yellow lateral marks; tergites three to five with conspicuous, yellow, round, lateral spots; posterior lateral angles of abdominal tergites three to five but little produced, about right angular, although rounded..*nortoni* (Cresson)

–. Malar space shorter than basal width of mandibles; face largely yellow, or at least with some yellowish medially; tergites three to five without round yellow spots on sides........3

3. Posterior lateral angles of abdominal tergites three to five but little produced, obtuse, rounded; body almost entirely black; ovipositor nearly three times as long as body..*atrata* (Fabricius)

–. Posterior lateral angles of abdominal tergites three to five produced, right angular or acute, although narrowly rounded; body brown or blackish, often with extensive yellow markings; ovipositor about twice as long as body........*lunator* (Fabricius)

MALES

1. Middle of posterior margin of heavily sclerotized portion of first sternite behind a vertical line through posterior end of first abdominal spiracle by distance equal to that from anterior end of first abdominal spiracle to anterior end of first tergite..*greenei* Viereck

–. Middle of posterior margin of heavily sclerotized portion of first sternite on or only slightly posterior to a vertical line through posterior end of first abdominal spiracle........................2

2. Malar space longer than apical width of mandibles; face black with broad, yellow, lateral marks; posterior lateral angles of tergites three to six produced and acute, although narrowly rounded..*nortoni* (Cresson)

–. Malar space as long as apical width of mandibles; face largely yellow, or at least with some yellowish medially........................3

3. Posterior lateral angles of abdominal tergites three to six but little produced, right angular or slightly acute, although rounded ....*atrata* (Fabricius)

–. Posterior lateral angles of abdominal tergites three to six produced, very acute..*lunator* (Fabricius)

MEGARHYSSA GREENEI Viereck

Although Rohwer (1920:426) agrees with Viereck in stating that the female of this species has a cloud below the stigma, specimens of both sexes from Ithaca, New York, June 25, 1917, collected by Dr. E. C. Van Dyke have clear wings. Dr. G. Stuart Walley writes that a majority of the specimens in the Canadian National collection have immaculate wings, although a few females have a spot behind the stigma.

MEGARHYSSA NORTONI (Cresson)

This is the only known species in the far west, where it is quite common; but it is also found in the east, although apparently rarely. Dr. Walley sends records of specimens from as far east as Grand River, Nova Scotia, and points out that in eastern specimens the abdomen is more brownish than in western ones, and the mesocutum usually brownish instead of black as in western individuals.

NEW YORK: Buffalo, October, 1900 (E. P. Van Duzee). UTAH: Aspen Grove, Mt. Timpanogos, July 6, 1935 (E. C. Van Dyke); Park City, July 3, 1922 (E. P. Van Duzee). BRITISH COLUMBIA: Nanaimo Biological Station, June 26, 1920 (E. C. Van Dyke); Trinity Valley, Lumby, September 2, 1937 (K. Graham). WASHINGTON: Steven Pass, Cascade Mountains, July 14, 1930 (E. C. Van Dyke). OREGON: Fremont National Forest, Klamath County, June 18, 1922 (E. C. Van Dyke). CALIFORNIA: Shasta Springs, June 5, 1920 (C. L. Fox); Mt. Shasta, July 30 (Graham Held); Meadow Valley, Plumas County, 4000 to 5000 feet, June 1 to 7, 1924 (E. C. Van Dyke); Cisco, June, 1910 (G. Von Geldern); Zenia, June 19, 1935 (H. J. Rayner); Fallen Leaf Lake, Lake Tahoe, July 9, 1915 (E. C. Van Dyke); Echo Lake, July 23, 1933 (E. C. Zimmerman); Yosemite Valley, July 8, 1921 (E. C. Van Dyke); San Mateo County, June 20, 1936 (G. E. Bohart); Carmel, June 10, 1908 (F. X. Williams); Huntington Lake, Fresno County, 7000 feet, July 4 (E. P. Van Duzee); Rock Creek Lakes, Inyo County, 9700 feet, July 19 to 21, 1934 (G. E. Bohart); Giant Forest, Tulare County, July 24, 1922 (C. L. Fox). The specimens recorded above are in the collection of the California Academy of Sciences.

MEGARHYSSA LUNATOR (Fabricius)

This is a widely distributed and highly variable species. Although specimens from any one locality exhibit a rather broad range of variation in size and coloration, a study of individuals from the entire distribution of the species shows that there are several well defined geographic forms, as described below.

MEGARHYSSA LUNATOR LUNATOR (Fabricius)

Ground color usually rather light brown; antennæ brown basally, yellower apically; face yellow with brown markings; wings clear, almost always with dusky area behind apex of stigma; stigma darker apically than basally; first tergite of female with apical yellow fascia; tergites three to seven of female each with a narrow V-shaped or curved yellow line on each side; first and second tergites of male each with small, apical, yellow fascia.

This form is found from the Atlantic coast to the eastern side of the Rocky Mountains, although apparently replaced by *phaeoptila* in parts of the southern states.

The dark area on the fore wings is frequently reduced in size in the males, and in one specimen from Ithaca, New York, collected by E. C. Van Dyke it is entirely missing. Also a female from Schuyler County, New York, August 28, 1878 (A. J. Burner) lent from the National Museum collection through Mr. R. A. Cushman has the dark areas of the wings inconspicuous and pale yellowish. Possibly it is a teneral or in some way bleached specimen.

Megarhyssa lunator phaeoptila Michener, new subspecies

Female: Ground color of body dark brown; antennæ yellowish brown; face largely brown; wings dark brown, with a clearer area behind base of stigma; stigma darker apically than elsewhere; first tergite with small yellow apical fascia; tergites three to seven each with a very narrow V-shaped or curved subapical yellow line on each side, these lines broken on sixth tergite.

Holotype (U. S. N. M. Type number 53193): Victoria, Texas, October 15, 1910, on oak tree in river bottom (J. D. Mitchell). Paratype: New Orleans, Louisiana (F. O. Minor). These specimens were lent to me by Mr. Cushman from the National Museum collection, to which they will be returned.

This is evidently a southern form of *lunator*, from which it may most easily be distinguished by its almost entirely dark brown wings (the wings are clear with a dark spot in typical *lunator*). Also the yellow lines on the sides of abdominal tergites three to seven of the female are narrower in *phaeoptila* than in *lunator*.

Two additional female specimens from Austin, Texas, October, 1900 (A. L. Melander collection), kindly lent me by Mr. R. D. Shenefelt of Washington State College, have the wings a little clearer basally and subapically than in typical *phaeoptila*, the ground color of the body not as dark brown as in the types, and the lateral yellow lines of the abdomen broader, as in typical *lunator*. Thus it is evident that *phaeoptila* intergrades with *lunator*.

Megarhyssa lunator icterosticta Michener, new subspecies

Ground color of body light brown; antennæ yellowish; face almost entirely yellow; wings light golden brown, with clearer area behind base of stigma in female, slightly darker area behind apex of stigma in male; stigma evenly brown throughout; first abdominal tergite of female without apical yellow fascia; tergites three to seven of female with broad yellow lateral areas, those of third tergite broad crescentic marks with lower arms longer than upper; fourth and fifth tergites yellow except for the margins and a middorsal band, narrowed posteriorly; sixth tergite yellow except for margins, seventh yellow except for posterior margin and area around spiracles; tergites one and two of male without apical yellow fasciæ.

Holotype, female, No. 4761, Calif. Acad. Sci., Ent., allotype, male, No. 4762, Calif. Acad. Sci., Ent., and thirteen paratypes from Durango, Colorado, collected on July 9, 1933, by my friend, Mr. K. L. Maehler. Females were ovipositing in a log. Additional specimens are from Ft. Douglas, Utah, June 15, 1933 (O. H. Swezey, Calif. Acad. Sci.), Salt Lake City, Utah, June 8, 1938 (Bill Higley); Beaver Canyon, Utah, August (U. S. N. M.); Oak Creek Canyon, Utah, July 12, 1930 (L. F. Clarke) and June 14, 1937 (L. R. Jeppson); Roosevelt, July 17, 1938 (G. F. Knowlton, F. C. Harmston); Grantsville, Utah, July 5, 1938 (L. L. Hansen); Tooele, June 21, 1930 (G. F. Knowlton, M. J. Janes); and Las Vegas, New Mexico (F. Springer, U. S. N. M.). Although these specimens are darker than most of the Durango specimens, especially in ground color, and some females have the yellow marks of the sides of the fourth tergite reduced to broad crescents like those of the third tergite, none approach the coloration of typical *lunator*. Nearly all specimens have the yellow markings of the thorax more extensive than in *lunator*. Paratypes will be placed in the collections of the United States National Museum, Colorado State College, University of Kansas, K. L. Maehler, and the author.

This is a very distinct subspecies of *lunator*, if it is not a distinct species. It occurs in the eastern part of the Great Basin region, on the western slope of the Rocky Mountains, and east into central New Mexico at least as far as Las Vegas. It is most noticeably separated from *lunator* by the light brown wings and the extensive yellow areas on the sides of the abdomen of the female. The absence of yellow apical fasciæ on the first two abdominal tergites of the male and the first tergite of the female in this otherwise strongly maculated form may lend weight to the idea that this is a distinct species.

MEGARHYSSA LUNATOR subspecies(?)

Under this heading I treat a single female specimen sent by Mr. Cushman from the National Museum collection. It is from College Farm, Mesilla Valley, New Mexico, April, 1898, collected by C. E. Mead, and from the T. D. A. Cockerell collection. It is similar to *icterosticta*, although its wings are slightly paler than in that subspecies, but the propodeum and first two abdominal tergites are almost entirely yellow, and its yellow markings otherwise are unusually extensive. Furthermore, the lateral angles of tergites three to five are unusually blunt for *lunator*, although there is some variation in this character in other subspecies. A male which is exceptionally pale for *icterosticta* and may belong to this form is from the Baboquivari Mountains, Arizona, September, 1924 (O. C. Poling, Calif. Acad. Sci.).

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